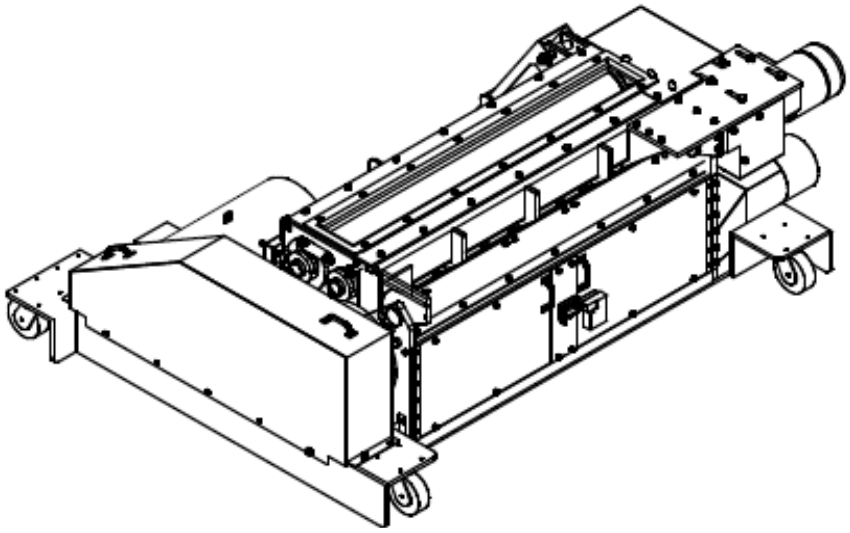
U-Series Thermoforming Granulator
Models: 44U, 56U & 74U

Part Number: U-0040-C
Bulletin Number: CG6-625
Effective: May 6, 2009



Write Down Your Serial Numbers Here For Future Reference:

_____ _____

_____ _____

_____ _____

We are committed to a continuing program of product improvement.
Specifications, appearance, and dimensions described in this manual are subject to change without notice.

DCN No. _____
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Shipping Info

Unpacking and Inspection

You should inspect your granulator for possible shipping damage.

Thoroughly check the equipment for any damage that might have occurred in transit, such as broken or loose wiring and components, loose hardware and mounting screws, etc.

In the Event of Shipping Damage

According to the contract terms and conditions of the Carrier, the responsibility of the Shipper ends at the time and place of shipment.

Notify the transportation company's local agent if you discover damage.

Hold the damaged goods and packing material for the examining agent's inspection. **Do not return any goods before the transportation company's inspection and authorization.**

File a claim with the transportation company. Substantiate the claim by referring to the agent's report. A certified copy of our invoice is available upon request. The original Bill of Lading is attached to our original invoice. If the shipment was prepaid, write us for a receipted transportation bill.

Advise customer service regarding your wish for assistance and to obtain an RMA (return material authorization) number.

If the Shipment is Not Complete

Check the packing list as back-ordered items are noted on the packing list. You should have:

- ☑ Granulator
- ☑ Bill of lading
- ☑ Packing list
- ☑ Operating and Installation packet
- ☑ Electrical schematic and panel layout drawings
- ☑ Component instruction manuals

Re-inspect the container and packing material to see if you missed any smaller items during unpacking.

If the Shipment is Not Correct

If the shipment is not what you ordered, **contact the shipping department immediately**. For shipments in the United States and Canada, call 1 (800) 229-2919; for all other countries, call our international desk at (508) 399-6400. Have the order number and item number available. *Hold the items until you receive shipping instructions.*

Returns

Do not return any damaged or incorrect items until you receive shipping instructions from the shipping department.

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Chapter 1: Safety

1-1 How to Use This Manual

Use this manual as a guide and reference for installing, operating, and maintaining your granulator. The purpose is to assist you in applying efficient, proven techniques that enhance equipment productivity.

This manual covers only light corrective maintenance. No other maintenance should be undertaken without first contacting a service engineer.

The Functional Description section outlines models covered, standard features, and safety features. Additional sections within the manual provide instructions for installation, pre-operational procedures, operation, preventive maintenance, and corrective maintenance.

The Installation chapter includes required data for receiving, unpacking, inspecting, and setup of the granulator. We can also provide the assistance of a factory-trained technician to help train your operator(s) for a nominal charge. This section includes instructions, checks, and adjustments that should be followed before commencing with operation of the granulator. These instructions are intended to supplement standard shop procedures performed at shift, daily, and weekly intervals.

The Operation chapter includes a description of electrical and mechanical controls, in addition to information for operating the granulator safely and efficiently.

The Maintenance chapter is intended to serve as a source of detailed assembly and disassembly instructions for those areas of the equipment requiring service. Preventive maintenance sections are included to ensure that your granulator provides excellent, long service.

The Troubleshooting chapter serves as a guide for identification of most common problems. Potential problems are listed, along with possible causes and related solutions.

The Appendix contains technical specifications, drawings, schematics, parts lists, and available options. A spare parts list with part numbers specific to your machine is provided with your shipping paperwork package. Refer to this section for a listing of spare parts for purchase. Have your serial number and model number ready when ordering.

Safety Symbols Used in this Manual

The following safety alert symbols are used to alert you to potential personal injury hazards. Obey all safety messages that follow these symbols to avoid possible injury or death.

DANGER! ***DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.***

WARNING! ***WARNING indicates a potentially hazardous situation or practice that, if not avoided, could result in death or serious injury.***

Caution! ***CAUTION indicates a potentially hazardous situation or practice that, if not avoided, may result in minor or moderate injury or in property damage.***

1-2 General Safety Regulations

This machine uses knives for the performance of its intended use. Consequently, it can be a dangerous machine to operate and maintain unless these safety regulations are followed.

These regulations should be read, understood and periodically reviewed by all personnel involved in any way with this machine.

Never operate or remove any machine components that are secured by wrench-type fasteners unless the motor is electrically locked out and the rotor is motionless.

Never operate the machine or jog the rotor unless the cutting chamber covers, discharge chute, or any guards or covers are in place and secure. Do not circumvent the safety interlocks.

Prior to clearing a jam or performing any maintenance, the motor should be turned off and electrically locked out. Be sure that the rotor has come to a stop. Hands must not be inserted into the machine to clear the jam.

Do not extend any part of the body into feed roll openings or discharge area unless the motors are electrically locked out and the rotor and feed rolls are motionless.

Never extend fingers through holes in screen.

Be sure that the v-belts are properly aligned and that tension is at its maximum.

Extreme care should be taken to see that all bolts are properly tightened at all times. During the operation of the machine, rotor knife bolts may come loose. Although fine threads are used on the rotor knife bolts because vibration does not easily loosen them, you should inspect the tightness of the bolts frequently.

This machine is designed for the granulation of plastic materials. Do not feed any other materials into the machine.

1-3 Responsibility

These machines are constructed for maximum operator safety when used under standard operating conditions and when recommended instructions are followed in the maintenance and operation of the machine.

All personnel engaged in the use of the machine should become familiar with its operation as described in this manual.

Proper operation of the machine promotes safety for the operator and all workers in its vicinity.

Becoming familiar with materials, inspection, speed limitations, screens, and guard maintenance and total user responsibility will assist you in learning potential areas in need of observation for danger.

Each individual must take responsibility for observing the prescribed safety rules as outlined. All caution, warning and danger signs must be observed and obeyed. All actual or potential danger areas must be reported to your immediate supervisor.

1-4 Warnings and Precautions

Our granulators are designed to provide safe and reliable operation when installed and operated within design specifications, following national and local safety codes.

To avoid possible personal injury or equipment damage when installing, operating, or maintaining this granulator, use good judgment and follow these safe practices:

- ☑ **LEARN AND OBEY** your company's safety policy regarding granulating equipment.
- ☑ **MOVING OR LIFTING THE GRANULATOR:** Although our equipment is built and engineered for great ruggedness in operation, care must be taken when moving the machine along the floor or lifting it. Damage may occur to sheet metal covers, electrical cabinets, or small brackets if pressure is applied to them when moving the granulator. When lifting the granulator, be certain of total machine weight and the capability of the lifting equipment. (See the Granulator Specification Sheets for machine weights and dimensions.)
- ☑ **GRANULATOR LOCATION:** Adequate area for routine maintenance should be provided in order to open the machine for knife, screen, or cleanout service. Proper service area clearances also should allow people who are working on the machine to be clearly visible to others, thereby reducing the potential safety hazards.
- ☑ **SAFE HOUSEKEEPING:** The work area must be kept clean and uncluttered during periods of operation or maintenance. No hand tools or other metal objects should be left on or around the machine. Any tools or other metal objects that mistakenly fall into the hopper feed opening can cause severe damage to internal cutting chamber, rotor and screen components.
- ☑ **SAFETY GLASSES OR A FACE SHIELD MUST ALWAYS BE WORN** when servicing or operating the machine. Although our machines are designed for the maximum in flyback control, caution must be used when operating near the hopper feed opening in order to guard against unexpected material flyback.
- ☑ **EAR PROTECTION** may be required when operating the machine during granulation of very hard or noisy materials. The Occupational Safety and Health Act of 1970 has established guidelines for Permissible Noise Exposures (OSHA 1910.95) that should be followed.
- ☑ **NEVER** attempt to operate the granulator unless it is fully assembled with all guards and interlocks in place and functional.
- ☑ **OBSERVE** all danger, warning, caution and safety labels on the equipment.
- ☑ Upon completion of any machine maintenance, be certain **ALL SAFETY GUARDS AND COVERS** are securely and properly fastened prior to resuming machine operation. All fasteners must be in place and properly tightened. **ANY SHORTCUTS MAY RESULT IN INJURY TO PERSONNEL OR DAMAGE TO EQUIPMENT.**
- ☑ **NEVER** wear any loose fitting clothes, neckties, or dangling items such as earrings, belts, or shoestrings. Jewelry, such as wristwatches, bracelets, or rings should NEVER be worn. Long hair must be tied back or placed in a tight fitting hairnet. NEVER lean against or rest hands or feet on the granulator when it is in operation or open for maintenance. NEVER stand on the granulator when it is in operation.

- ☑ **ROTATION OF MOTORS:** The correct rotating direction for the granulator motor is clearly marked on the machine. Always check for proper rotation of motors. Incorrect rotation direction can cause severe damage.
- ☑ **ELECTRICAL GROUNDING:** All electrical equipment on the granulator must be grounded in accordance to all local codes and Article 250 of the National Electric Code.
- ☑ **ALWAYS DISCONNECT AND LOCKOUT** the main electrical power to the granulator before performing any service.
- ☑ **SAFETY INTERLOCKS MUST NOT BE BYPASSED.** The mechanical and electrical safety interlocks ensure the safety of personnel. They should never be tampered with or removed for ANY reason. They should be checked frequently by a qualified mechanic for proper operation.
- ☑ **NEVER** modify the machine configuration or any individual component without written notice from the factory.

For further information on granulator safety, installation, and operation, see the *American National Standard for Plastics Machinery—Granulators, Pelletizers, and Dicers Used for Size Reduction of Plastics—Construction, Care, and Use*. ANSI B151.11-1982.

We have long recognized the importance of safety and have designed and manufactured our equipment with operator safety as a prime consideration. We expect you, as a user, to abide by the foregoing recommendations in order to make operator safety a reality.

Chapter 2: Functional Description

2-1 Models Covered in This Manual

This manual provides the necessary instructions for the installation, set-up, and maintenance of our 44U (44”), 56U (56”) and 74U (74”) thermoforming granulators.

2-2 General Description

The thermoform granulator is a rugged, low-profile, rotary-cutting machine, designed to cut, chip, and granulate the toughest thermoforming materials with a minimum expenditure of horsepower.

A massively-built, high-inertia rotor with inclined knives gives more linear inches of cut, greater capacity, and assures long, trouble-free service.

This extra capacity (not needed for normal operation) provides some surge capacity for handling any incorrectly thermoformed material (as at initial start-up), which has not been trimmed.

The access panel easily lifts off to fully expose the removable screen(s), the upstroke bed knives, and rotor knives. Covers on the opposite side can be removed to expose the downstroke bed knife shields and knives.

Reclamation of skeletal webs, sheet, and small parts for inclusion and application in any type of thermoforming or extruding equipment is a specifically designed capability, and depending on the screen size used, this machine will provide granulate or chips to meet most requirements.

With no special enclosures, this granulator sets the industry standard for noise reduction with 95 dbA or less in most applications. Our traditional ruggedness includes heavy steel knife blocks and a cutting chamber made of thick steel plate with oversize bearing housings.

Safety interlock switches prevent starting the machine with the in-feed chute or front access door removed.

2-3 Typical Features and Components

Hopper

The V-shaped in-feed chute is an upright enclosure that is bolted to the top of the granulator and is easily removed for unobstructed access to cutting chamber or the feed rolls where applications require a feed roll assembly. It is designed to direct continuous reclamation of skeletal web directly from the thermoform trim process.

Cutting Chamber

The cutting chamber is a rectangular enclosure comprising the main frame, with an access panel that lifts off to fully expose the upstroke bed knives, a balanced rotor with split offset rotor knives and removable screen. The covers on the opposite side can easily be removed to expose the downstroke bed knife shields and knives.

Both the bed knives and bed knife shields are adjustable, and the bed knives have reversible cutting edges for extended life.

The internal surfaces of the solid steel cutting chamber are machined to an exceptionally smooth finish for ease of clean-out. The scissor-type cutting action of the angled rotor knives gives optimum cutting efficiency with lower power consumption.

The screens are mounted in a swing-down cradle, positioned just below the rotor and act as a classifier for the granulated material, retaining the material in the cutting chamber until the particle size is such that it will pass through the screen holes.

The high-alloy steel rotor carries the rotor knives. High strength alloy steel screws are used for attachment of all knives to the rotor.

Drive System

The drive system consists of a TEFC 1200 RPM motor set on an adjustable sliding base that is mounted at the left end of the granulator. The motor drives the rotor directly and the feed rolls are driven through a gearbox for assured RPM control. A belt guard shields the motor drive sheave, feed roll reductor, rotor sheave and belts. Another guard at the opposite end shields the feed roll sprockets and other mechanisms for complete safety.

Discharge System

The granulated material that falls through the screen is collected in a transitional section located at the bottom of the granulator and directed through the base area to the right side of the granulator for discharge with an airveyor system.

The transition section is connected to a blower (airveyor system), which conveys the granulated material (through ducting) to the cyclone separator. The cyclone separator allows the granulated material to drop out of the air stream into a bin or container.

Base

The base is caster-mounted, with four swivel (two locking) casters for easy positioning.

2-4 Safety Features

Safety Switches

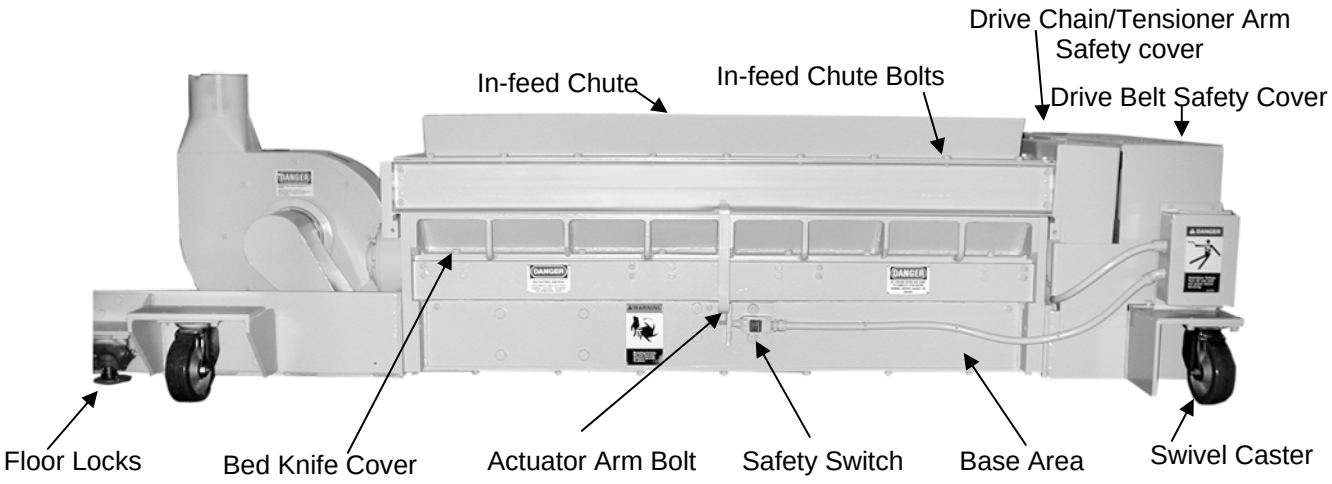
Safety switches at all access covers are wired into the starter control circuit. The machine cannot be started when these parts are open. However, for safety purposes, the machine should be disconnected from the power lines by a disconnect switch or by removing the plug from its receptacle. Check all safety switches periodically for proper operation.

Figure 1 shows some of the bolts, interlocks, and limit switches you may need to adjust during maintenance. Refer to this diagram while performing the maintenance procedures.

Safety Tags

A set of metal plates is attached to the machine to warn of potential danger.

Figure 1: Safety Features, Interlocks, and Limit Switches



Chapter 3: Installation

3-1 Uncrating the Equipment

The complete granulator, including accessory and auxiliary equipment, is packed in a special wooden case for shipment. Refer to the Appendix for detailed dimensional data and pertinent weights.

Prepare in advance the site you have selected for installation of the granulator. Be certain that the area to be occupied by the machine is clean, level, and free of obstructions. The machine should be set on a concrete floor, and care must be taken when moving the machine across a hollow timber floor, so that the point loading of the casters does not cause damage. The site you have selected must have a floor rating to adequately support the weight of the machine. If necessary, use steel shims to level the machine.

Locate the machine so that access is given to electrical components, screen, and hopper. Maintenance personnel should have unobstructed access to the units on which they will be working.

To avoid squeezing people working near a machine, there should be adequate clearance maintained between machines, walls, or partitions. Hinged doors and covers should have full swing. Restrictions may force work in cramped quarters. An off-balance operator with an awkward reach into a partially obscured area is unsafe.

If inspection after shipment has revealed no shipping damage, unpack the unit by removing all hold-downs, tie-downs, bolts, nuts, etc. Remove the envelope with the electrical schematics and instruction manual from the base evacuation area.

You can now have the machine lifted from the skid. To lift and move the granulator safely and correctly, cover any sharp corners or edges, and use the type of equipment that has the most appropriate features and capacity. Use the designated lifting points, and do NOT lift the machine by the hopper handles or guards.

3-2 Belt Tensioning

Belt drives should initially be tensioned at the “run-in” recommended force. Check the tension at least twice during the first two days of operation. After the belts have seated themselves in the sheave grooves and the initial stretch is removed, re-tension the belts to “normal running” and check periodically to maintain tension at the recommended value. See Section 5-5 on page 23 for the belt tensioning procedure.

3-3 Electrical Connections

Granulator controls (if ordered) are shipped separately for mounting at a suitable location. The safety interlock switches are connected to a common terminal box for ease of wiring. The customer is required to provide a suitable fused supply with a disconnect switch and a cable for the incoming line to the control (if ordered with the machine).

Refer to the technical specifications in the Appendix for horsepower, voltage, phase, and frequency requirements to determine the size and rating of the supply cable required.

If optional controls are required, an electrical wiring diagram will be provided with the machine in addition to the basic electrical diagram.

When the customer is providing either the motor or the control, the machine must be wired in accordance with the basic electrical diagram and the starter manufacturer's instructions.

Use the following steps to complete the electrical connections:

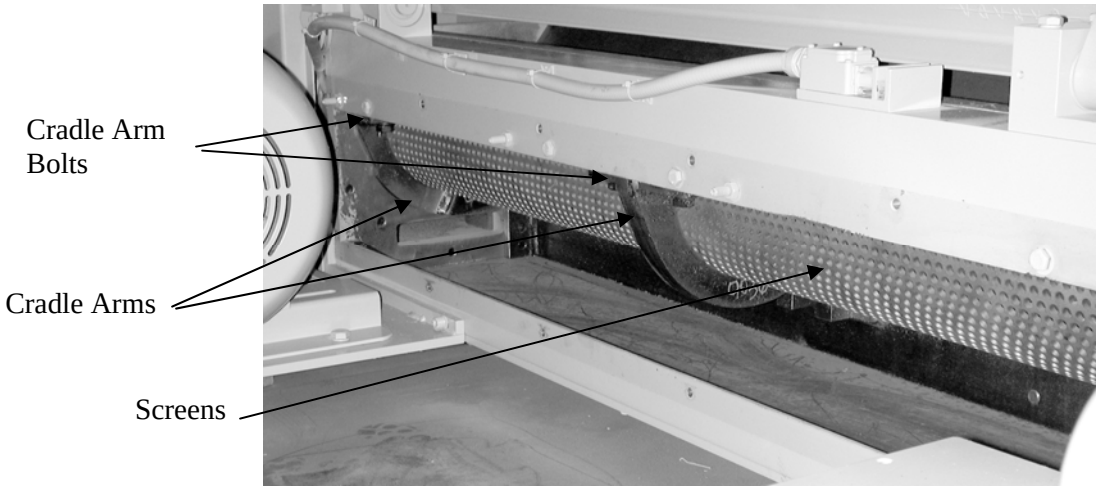
1. Check to be certain that the starter heater elements correspond with the motor requirements. If controls are not supplied, the limit switches supplied on the machine must be wired into the circuit at the common terminal box.
2. Check that the limit switches are closed.
3. Turn switch ON at main power supply.
4. Jog motor by pressing the START and then the OFF button. This starts and stops the motor.
5. With the electrical power ON, check that the motor rotates in a clockwise direction at the viewing port in the belt guard. If motor rotation is correct, continue to the next step. If rotation is incorrect, complete the following procedure:
    a. Shut power OFF and disconnect incoming power supply.
    b. Reverse any two of the three power line connections to the machine.
    c. Re-connect the incoming power supply line and turn ON the main power switch to recheck motor drive rotation.
6. If Airveying system (optional) is fitted, press the Airveyor START button, and check the blower motor rotation. The blower motor should rotate in a counterclockwise direction. If blower motor rotation is correct, continue to step 7. If blower motor rotation is incorrect, complete the following procedure:
    a. Shut power OFF and disconnect incoming power supply line.
    b. Reverse any two of the three power line connections to the blower motor.
    c. Re-connect the incoming power supply line, and recheck the blower motor rotation.
7. Allow all motors to run up to speed for at least 30 seconds.

3-4 Accessing the Cutting Chamber

You will need to access the cutting chamber before initial startup and for various maintenance procedures. Use the following procedure to access the cutting chamber:

1. Turn the main power off, remove the line fuses, and tag the machine as out of service.
2. Remove the access panel bolts. (This includes the safety switch actuator arm bolt), and lift up and out to remove the access panel. The panel has a bottom internal skirt that must be lifted clear of the base strip.
3. Remove the cradle arm bolts and swing the screen cradle arms down (See Figure 2).
4. Remove the screen.

Figure 2: Screen Cradle and Screens



3-5 Closing the Cutting Chamber

After completing any maintenance or adjustments inside the cutting chamber, use the following procedure to close the cutting chamber and resume use of the granulator:

1. Replace the screen in the cradle arms, making sure that the far edges is trapped beneath the downstroke bed knife block. Tighten the cradle arm bolts.
2. Replace the access panel and tighten in position, making sure that the interlock screw sets the safety switch actuator arm into its correct operating position.
3. Replace line fuses, turn power on, and remove the out of service tag from the machine.

3-6 Initial Start-up

This machine has been run under power and tested at the factory prior to shipment. The necessary settings and adjustments have been made so that a minimum amount of setting up or re-adjustment is required when starting up the machine in its new location.

With all electrical, mechanical connections and lubrication requirements having been attended to, the following start-up steps should be carefully carried out before attempting to place any material into the in-feed hopper. Use the following procedure to prepare the machine for initial start-up:

WARNING! ***Before operating the granulator, insure that the granulator has been correctly assembled and wired.***

1. Access the cutting chamber as described in Section 3-4 on page 14.
2. Thoroughly clean the rust preventative materials or grease from the hopper, the inside of the cutting chamber, knives, rotor, screen, discharge system, and exterior of the machine. Do not use solvent on any of the painted areas, as solvent may damage the paint.
3. Check all rotor knives to make sure they are properly seated on the rotor and securely fastened. Although they are ground as a set, one knife will probably be .001” to .002” higher than the others. This should be marked and used when adjusting the bed knives for proper clearance.
4. Use a feeler gauge to check the clearance between the rotor and the bed knives by turning the rotor backwards. Rotating the rotor backwards gives a better feel and does not cut the gauge, should the knives be too close. Check the knives on each end only. Proper clearance is 0.15 mm (0.006”) to 0.20 mm (0.0008”). This clearance is slightly greater at the center of the knives.

Note: Recheck knife clearance after the first 24 to 36 hours of operation.

5. To make the adjustment on the bed knives, the bed knife adjusting screws should be hand tightened to hold the knife firmly against the knife seat while adjusting the knife forward using push and pull screws. After the clearance is set, torque the 16 mm screws to 271 Nm (200 lbs./ft.).

Note: All screw tightening torque figures are for un-lubricated thread conditions. Screw threads should be wiped with an oil-dampened cloth before installation to prevent galling.

6. With the exposed parts of the machine thoroughly clean, and all knife clamping bolts securely fastened, close the cutting chamber as described in Section 0 on page 14.

Note: After initial start-up, the rotor knife retaining screws should be checked after 8 hours running to be assured that 271 Nm (200 lbs./ft.) of torque is maintained. Thereafter, rotor knife retaining screws should be checked weekly.

Note: The rotor must be rotated at least two rotations every 30 days to prevent brinnelling and corrosion of raceways.

Chapter 4: Operation

4-1 Start-up

Before starting the machine, check that the rotor rotates freely by rotating it by hand from outside the machine using either the coupling or the sheave depending on the type of drive. Inspect the cutting chamber carefully to insure that nothing has fallen into it, such as bolts or tools. Make sure all screws and bolts are properly secured. Check all electrical connections and motor rotations. See Chapter 3 on pages 12-15 for detailed set-up instructions. Allow all motors to run up to speed for at least 30 seconds.

4-2 Feeding the Granulator

Feed the granulator through the V-chute opening in the hopper. The method of feeding the granulator depends on the physical form and nature of the material being processed.

For maximum efficiency, the granulator should be fed at a rate that is consistent with its capacity; i.e., if the granulator is rated at 60 kg./hr. (132 lbs./hr.), then the general feed rate is 1 kg./min. (2.2 lbs./min.). Under these operating conditions, the correct proportions of cut and uncut particles will be present in the cutting chamber.

WARNING! ***Under no circumstances should the operator attempt to reach into the hopper to dislodge any bridged or jammed material while the granulator is in operation. To clear the hopper of bridged or jammed material, the machine main power must be turned off and the machine isolated.***

4-3 Clearing a Jammed Cutting Chamber

Never attempt to free a jammed machine by placing hands on the rotor, rotor knives, or inside the cutting chamber. Hands must be kept clear of the rotational path of the rotor knives.

Good footing on a clean floor is essential and the body should be well braced to guard against loss of balance should the jam suddenly come free.

Use the following procedure to clear a jammed cutting chamber:

1. Disconnect and lock out power.
2. Be certain that the rotor is motionless.
3. Open the machine as instructed in Section 3-4 on page 14.
4. Use a pry bar to exert force on the rotor, usually in the direction opposite normal rotation. A leather mallet and a block of wood of sufficient length to keep hands away from path of knives can be used if necessary.
5. Use pliers to remove material from the cutting chamber, keeping in mind that the removal of material may cause rotation of the rotor and rotor knives.
6. After clearing the jam, be certain that the screen and all guards and covers are secured in place before connecting power and starting the machine.

4-4 Shut-down

Use the following procedure to properly and safely shut down the machine:

1. Stop all feeding of material.
2. Allow the granulator to run until the cutting chamber is completely empty.
3. Press the drive motor “stop” button. This shuts off the rotor drive motor.
4. After the granulator has stopped, press the airveyor stop button (if applicable) located at the blower motor.
5. Turn the main power switch to off.

Chapter 5: Maintenance

5-1 Preventative Maintenance Schedule

Check	Frequency
Operation of safety interlock switches	Daily
Knife clearance (0.15 mm – 0.20 mm; 0.006” – 0.008”)	Weekly
Knife retaining screws for tightness (271 Nm; 200 lbs./ft.)	Weekly
Knife exposure (1.0 mm; 0.040”)	Weekly
Belt tension	Monthly

5-2 Lubrication

The main drive motor, rotor bearings, feed roll reductor, tension idler sprocket, feed roll cartridge bearings, and feed roll drive chain are all pre-lubricated at the factory. Check and re-lubricate according to Figure 3.

Figure 3: Lubrication Requirements

Lubrication Point	Lubricant	Frequency
Drive motor	Refer to instruction plate on motor	4 months or 3000 hours
Feed roll reductor	#90 Lube oil	Refill as needed
Feed roll cartridge bearings	Chevron SRI #2 Exxon Andok C Lidok EP1	2 months or 1500 hours. Grease when machine is stopped until small bead appears at bearing seal, then wipe clean.
Feed roll tension arm idler sprocket	Chevron SRI #2 Exxon Andok C Lidok EP1	2 Months or 1500 hours. Grease when machine is stopped until small bead appears at nut edge, then wipe clean.
Feed roll drive chain	Molykote Lubricant	As required by visual inspection
Rotor bearings	Chevron SRI #2 Exxon Andok C Lidok EP1	2 Months or 1500 hours at 1 oz./bearing.

5-3 Replacing and Adjusting the Knives

During use, the clearance between the rotor knives and the bed knives will increase due to wear. This is a normal condition that requires re-setting this clearance once or twice before it is necessary to remove the knives for regrinding. Check the knives weekly for wear, clearance, exposure, and screw tightness.

When new knives are fitted to the machine, adjustment after eight hours of running time may be required.

Before assembling a new or reground set of knives, make sure the knife seats and mounting holes are clean. Do not use grease or oil on screws or tapped holes when assembling the knives.

Knives must be replaced in complete sets, otherwise it will not be possible to obtain even clearance between the rotor knives and bed knives.

WARNING! ***Before applying a wrench to any knife bolt, be certain that the rotor is blocked to prevent rotation. One such method is to use a block of wood at least 1 1/2" thick between a knife and a fixed portion of the frame.***

Rotor Knives

We recommend that the rotor knife screws be replaced with new screws every sixth knife change to reduce the risk of screw failure due to overstretching. Screws must be replaced with the type specified in the spare parts list. Use the following procedure to replace or adjust the rotor knives:

Caution! ***Rotor knives should be changed one seat at a time to prevent rotor from being rotated in an out-of-balance condition.***

1. Access the cutting chamber as directed in Section 3-4 on page 14.
2. Remove the downstroke cover screws at the rear of the machine (this includes the safety switch actuator arm screw), and carefully slide the covers out of the machine. (See Figure 4 on page 21.)
3. Set back the bed knives to clear the rotor knives so that the rotor can revolve freely.
4. Remove the screws holding the knives to the rotor and remove the rotor knives.
5. Thoroughly clean the knife seats, and replace the knives.
6. Lightly tighten the screws and check that a 0.04 mm (0.0015") feeler gauge will not pass between the back of the knife and the knife seat. Tap the knife gently with a rawhide hammer if necessary to close the gap.
7. Tighten the screws evenly and torque the high tensile 16 mm screws to 271 Nm (200 lbs./ft.)

   Note: Bolt threads should not be oiled. Wipe thread with and oil-dampened cloth.

8. Re-check the gap between the back of the knife and the knife seat. If necessary, readjust the knife.
9. Adjust the clearance between the bed knives and rotor knives. (See "Bed Knives" on page 20.)

Bed Knives

We recommend that the same screws and washers be re-used only when the bed knives have been repositioned or re-ground. When blunt knives are discarded and replaced with new knives, use new screws and washers. This will reduce the risk of screw failure due to their overstretching. Screws and washers must be replaced with the type specified in the Spare Parts List. Use the following procedure to replace or adjust the bed knives:

1. Access the cutting chamber as directed in Section 3-4 on page 14.
2. Remove the downstroke cover screws at the rear of the machine (this includes the safety switch acutator arm bolt), and carefully slide the covers out of the machine. (See Figure 4 on page 21.)
3. Remove the bed knife shield screws and lift off the bed knife shield.
4. Remove the screws holding the bed knives, and remove the bed knives.
5. Before installing and adjusting the bed knives, check all rotor knives to make sure they are properly seated on the rotor and securely fastened.
6. Thoroughly clean the knife seats.
7. Replace the bed knives on the bed knife seat and tighten the screws until they are finger-tight.
8. Use the adjustment screws (See Figure 4 and Figure 5 on page 21) to set the knife clearance to 0.15 mm – 0.20 mm (0.006” – 0.008”). The clearance should be measured with a feeler gauge at the ends of the knife, by rotating the rotor sheave backwards by hand. The clearance is slightly greater at the center of the knives.
9. Tighten the bed knife screws evenly and torque the 16 mm screws to 271 Nm (200 lbs./ft.).
10. Replace the bed knife shield and adjust the shield using its push and pull screws so that its front edge is within 1.0 mm (0.040”) of the bed knife edges. If strip material is to be cut, reduce the knife exposure to less than the strip thickness to prevent material built-up on the bed knives.
11. Make sure all screws, bolts, and nuts are properly tightened.
12. Reset the downstroke cover in position and tighten in place with the downstroke cover screws. Make sure the safety switch actuator arm screw sets the arm in the correct switch operating position.

Figure 4: Downstroke Cover and Bed Knife

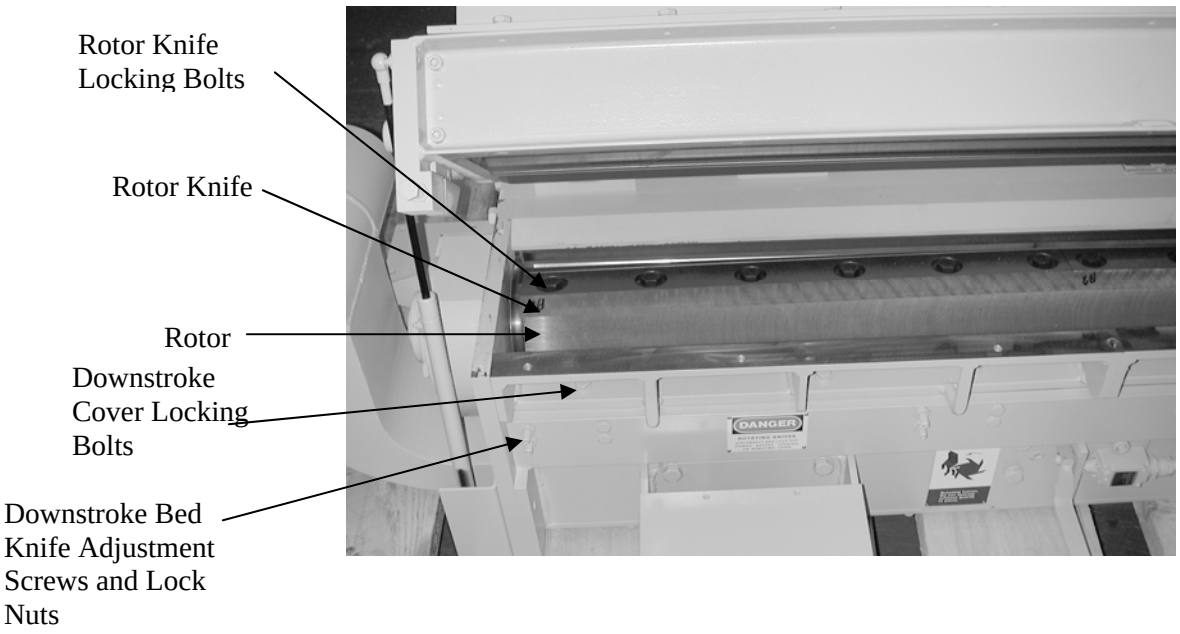
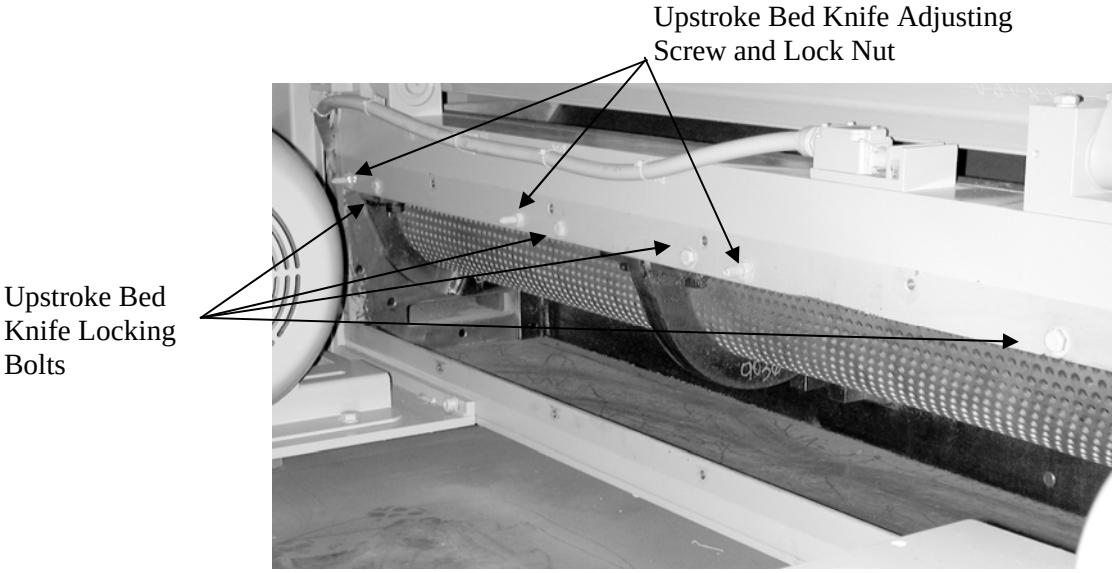


Figure 5: Upstroke Bed Knife and Screens



5-4 Sharpening the Knives

Under normal operating use, the cutting edge of the knives will eventually become dulled, resulting in reduced cutting efficiency. The blunt knives may either be re-ground to restore the cutting edge, or replaced with new knives when regrinding is not possible.

Rotor Knife Sharpening

The rotor knife can be re-sharpened to the diagram below. The three knives must be sharpened to within 0.076 mm (0.003”) of each other. Greater dimensional variations will cause difficult when setting the knife gap and create other serious complications.

When sharpening, it is not harmful to allow a few small nicks to remain in the cutting edge. Grinding the cutting edge until perfectly clean can sometimes be wasteful.

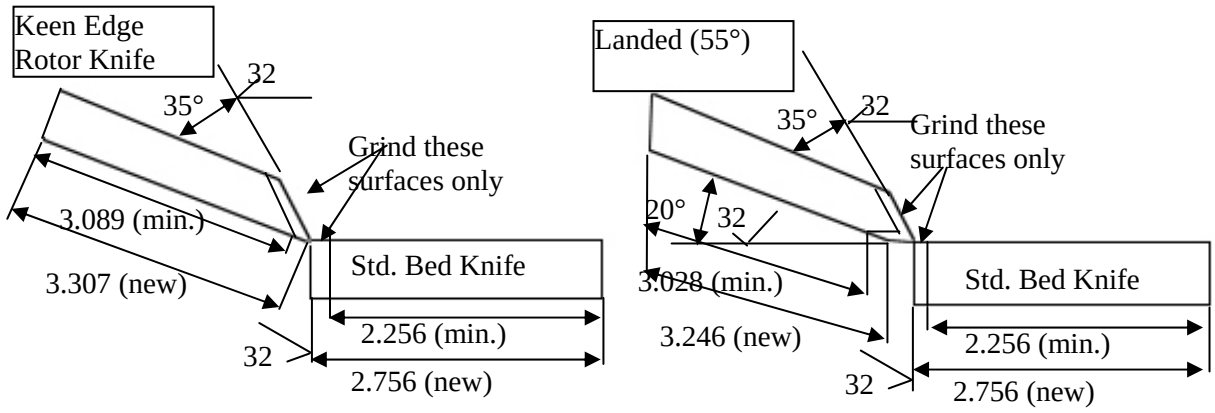
Do not install rotor knives that are smaller than the minimum dimension shown, because the fasteners that secure these knives will interfere with the cutting circle. If the rotor cannot turn, the bed knives will be damaged.

Bed Knife Sharpening

Each bed knife is provided with four cutting edges. When the exposed edges become blunt, the knives can be turned and repositioned to present the new cutting edges. When re-sharpening is necessary, refer to the diagram below.

It is not necessary to grind bed knives to the closely matched tolerance of rotor knives. As with rotor knives, small nicks in the cutting edges will not seriously affect knife cutting efficiency. Bed knives smaller than the minimum dimensions shown must be replaced along with the fasteners that secure them.

Figure 6: Knife Sharpening Specifications



5-5 Adjusting Belt Tension

For continuous reliable operation of the granulator, it is important that the belt tension is correct. Correct tension reduces wear on rotor and motor bearings and keeps belt slip to a minimum. Figure 7 gives the recommended force to deflect each belt by an amount equal to the belt span divided by 64. A gauge is available through the sales department to measure the deflection and force. Use the following procedure to adjust the belt tension:

Tension new belts at the maximum run-in force, and check the tension at least two times during the first two days of operation. There is normally a rapid decrease in the tension until the belts are run in.

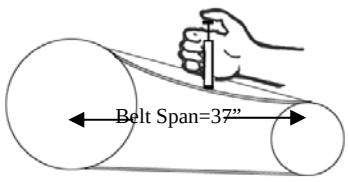
Note: The deflection force value shown must be multiplied by the number of V-belt elements.

1. Turn off the granulator at the main isolator switch and remove fuses.
2. Remove the belt guard to gain access to the belts.
3. Determine the type of belt required from the Spare Parts List on page 34.
4. Determine the force required to deflect one belt 1/64" (0.40 mm) per 1 inch (25.4 mm) of span length.
5. Loosen the motor base slide mount screws and turn the adjusting screw on the base to tension the belts as required (See Figure 7).
6. Re-tighten the screws, making sure the sheaves are in correct alignment.
7. Replace the covers.

Figure 7: Belt Tensioning Information

V-Belt Cross Section	Small Sheave Diameter Range (Inches)	Small Sheave RPM Range	Speed Ratio Range	Recommended Deflection Force (Lbs.)	
				Run-In	Normal Running
B	3.4	1160 to 1800	2.0 to 4.0	5.4	3.8
	4.6			7.4	5.1
	5.0-5.2			8.5	5.8
	5.4-5.6			9.1	6.2
	6.0-6.8			10.0	7.1
	7.4-9.4			12.0	8.1
BX	3.4	1160 to 1800	2.0 to 4.0	7.4	5.2
	4.6			10.0	7.1
	5.0-5.2			11.0	7.3
	5.4-5.6			11.0	7.4
	6.0-6.8			11.0	7.7
	7.4-7.9			12.0	7.9

*This deflection force value relates to a single V-belt element. Therefore, if the belt is a 3-V element (3V-banded), this value must be multiplied by 3.



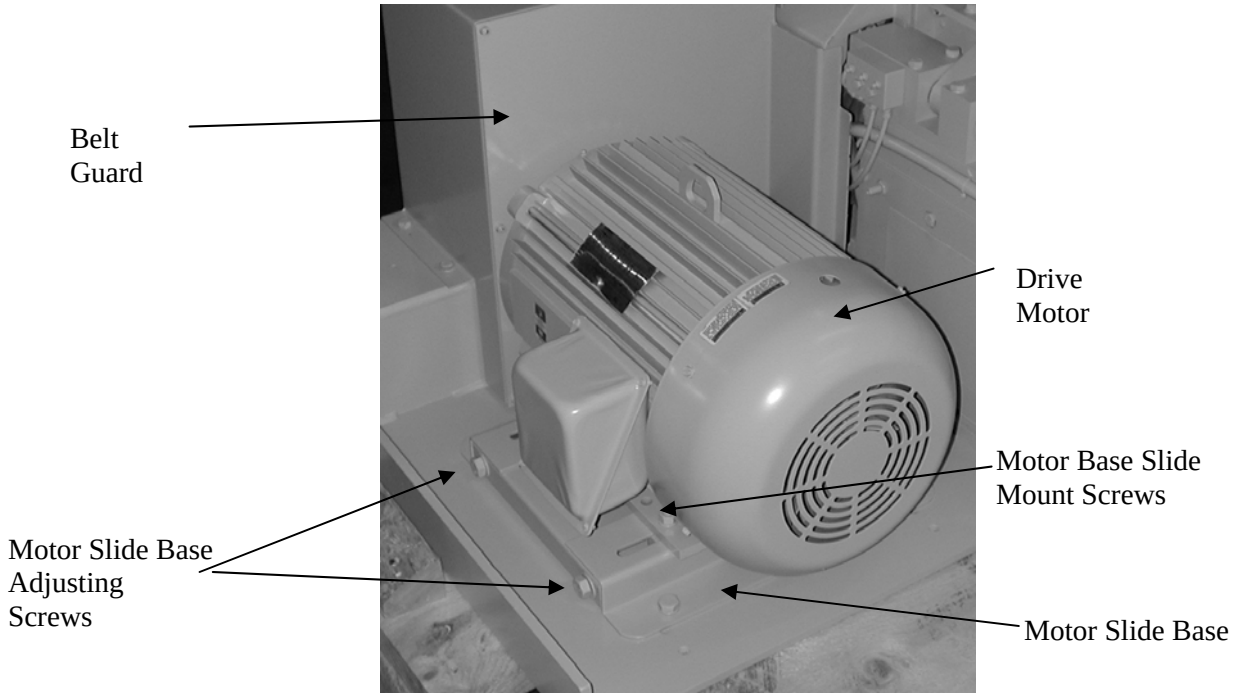
$$\text{Deflection} = \frac{\text{Belt Span}}{64}$$

5-6 Motor Drive Belt Replacement

Use the following procedure to replace the drive belts:

1. Turn off the main power and remove fuses.
2. Remove the belt guard to gain access to the belts (See Figure 8).
3. Turn the adjusting screw on the motor slide base to release all tension from the belts.
4. Remove the belts
5. Install the new belts and proceed to adjust the belt tension as instructed in Section 5-5 on page 23.
6. Replace base panels and guards.
7. Replace the line fuses and turn main power on.

Figure 8: Adjusting the Motor Base



Chapter 6: Troubleshooting

6-1 Introduction

The utmost in safety precautions should be observed at all times when working on or around the machine and the electrical components. All normal trouble-shooting must be accomplished with the power off, line fuses removed, and with the machine tagged as out of service.

The use of good quality test equipment cannot be over-emphasized when troubleshooting is indicated. Use a good ammeter that can measure at least twice the AC and DC current that can be encountered for the machine. Be sure that the voltmeter has at least minimum impedance of 5,000 OHMS-per-volt on AC and 20,000 OHMS-per-volt on DC scales. Popular combination meters, VOM and VTVM can be selected to provide the necessary functions.

Before making haphazard substitutions and repairs when defective electrical components are malfunctioning, we recommend that you check the associated circuitry and assemblies for other defective devices. It is common to replace the obviously damaged component without actually locating the real cause of the trouble. Such hasty substitutions will only destroy the new component. Refer to wiring diagrams and schematics.

Locating mechanical problems, should they occur, is relatively straightforward. When necessary, refer to the parts catalog section.

6-2 Electrical Faults

Problem	Possible Cause	Possible Remedy
Motor Fails to Start	Supply failure	Check fuses
	Starter inoperative	Check main supply
	Starter overloads or cuts out	Check motor requirements and adjust accordingly
	Safety switches inoperative	Check and adjust as needed
Motor starts but will not take load	Too much belt tension	Check belt tension and adjust as necessary
	Incorrectly connected motor	Check terminal connection with manufacturer's connection diagram and adjust as necessary
	Defective starter winding	Check current in each phase with ammeter, if there is a marked difference in current in one phase, contact motor manufacturer
Motor will start when disconnected from load but not when connected	Worn bearings	Check and replace if necessary according to manufacturer's literature

6-3 Processing Faults

Problem	Possible Cause	Possible Remedy
Stalling	Overfeeding	Reduce feed rate
	Partial or complete screen blockage	Remove screen, clear and inspect for damage
	Insufficient tension on v-belt drive causing belt slip and burning	Check tension of the belt and adjust as necessary
		Check that the motor slide base screws are secure
	Badly blunted or damaged knives	Fit re-sharpened or new knives as required
	Knife setting too wide	Check clearances given and adjust as required
	Installation fault; motor running in reverse direction	Check with direction arrow and re-fit electrical connections to give the correct direction
	Safety switch cut out where fitted	Tighten safety switch setting screw
Material overheating	Check all possible causes under “stalling”	Remedy as shown above
	Screen size too small	Increase screen size
	When granulating rubber, insufficient talc causes freshly cut surfaces to re-adhere	Increase talc percentage rate of in-feed
	Blockage in aiveyor	Check direction of fan rotation, check venturi and line or chute for blockage

6-4 Mechanical Faults

Problem	Possible Cause	Possible Remedy
Bearing overheating	Excessive tension on the belt drive	Check tension of belt and adjust as necessary
	Lubrication fault	Check lubrication frequency and recommended lubricant
Visible cracks in knife	Incorrect grinding or grinding procedure	Check method of grinding and contact our technical sales department
Knives moving on knife seats	Uneven knife seat surfaces	Clean up to provide maximum bearing surface
	Loose knife screws	Knife screws should not be used more than six times. Replace if there is evidence of stretch
Knives breaking	Cracks caused by incorrect grinding	Contact our technical sales department
Excessive knife wear	Open knife setting	Re-set knives
Screen breakage	Incorrectly seated screen	Check that the screen is seated correctly and fully in its cradle

Chapter 7: Appendix

7-1 Customer Satisfaction Warranty Program

The terms and conditions of the warranty set forth are for one (1) year from the original date of purchase by the original purchaser.

The manufacturer warrants to the original purchaser the product and/or goods to which this disclaimer is attached, and manufactured by us, to be free from defects in material and workmanship under normal use and service. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS AND LIABILITIES ON OUR PART.

This warranty shall not apply to any goods or product manufactured by us which has been subject to accident, negligence, alteration of any kind, abuse, or misuse. We further make no warranty whatsoever in respect to accessories or parts not supplied by us. Any warranty of any nature shall apply only to an “original purchaser” which shall be deemed to mean that person or entity for whom the goods and/or product were originally ordered and installed.

We neither assume nor authorize any person to assume for us any liability in connection with the sale or use of the products and goods sold hereunder, and shall not be responsible for damages for which a purchaser may be liable to other persons, damages to property, or injuries to any other persons.

Our sole obligation under this warranty shall be limited to replacing, repairing, or exchanging any part or parts of goods and/or products sold which we determine are defective under normal use and service within one (1) year of date of installation by the original purchaser. We shall not be liable for any loss or damage resulting directly or indirectly from the use or loss of the goods and/or products purchased. In no event shall we be liable for any general, direct, consequential, incidental, or special damages of any kind.

We do not warrant any of our products that are installed in other machines or apparatus as meeting requirements of any safety code of any nature. The purchaser assumes all risks and liabilities resulting from the installation and use of product sold by us in combination with other machines or apparatus.

We warrant our product to be of the kind and quality quoted, and no other warranty except of title shall be implied. Our company shall repair or replace, at our discretion, any manufactured item on your granulator without charge FOB factory, within one (1) year after date of original purchase, which is proved to be defective when shipped. Claims for labor or consequential damages are not allowed.

Excluded from the above are knives, screens, and belts. Purchased items, including electrical components, motors, etc., shall carry the warranty of the supplier and no extension of that warranty is allowed.

Refer to this manual for assistance in installing and maintaining a highly efficient machine. Questions regarding areas that are not covered in the manual should be referred to the customer service manager at the factory at (800) 229-2919.

7-2 Drawings and Specifications (including options)

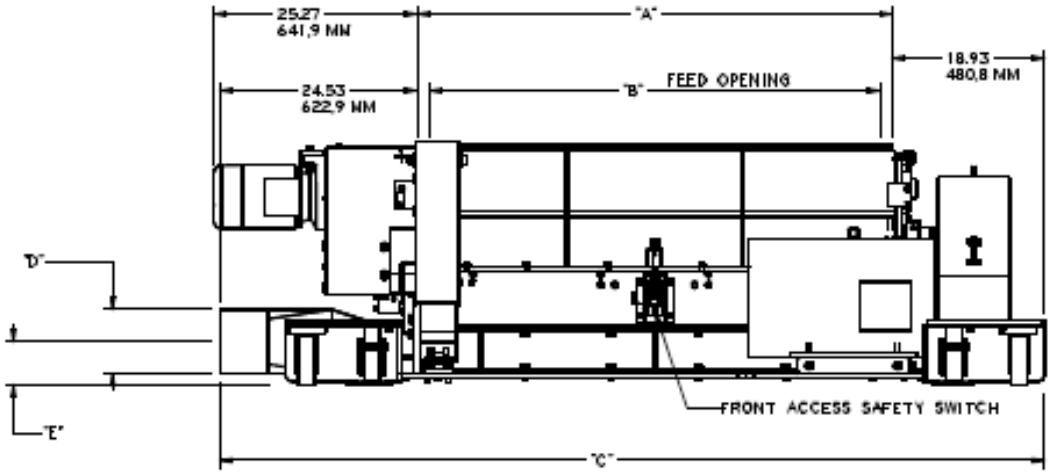
Features

Model	Throat Size	Cutting Circle Diameter	Throughput (estimated – material dependent)	Approximate Weight
44U (44”)	12” x 44” (305 x 1118 mm)	12” (305 mm)	Up to 1,600 lbs./hr. (Up to 726 kg./hr.)	4,000 lbs. (1814 kg.)
56U (56”)	12” x 56” (305 x 1422 mm)	12” (305 mm)	Up to 2,000 lbs./hr. (Up to 907 kg./hr.)	5,300 lbs. (2404 kg.)
74U (74”)	12” x 74” (305 x 1880 mm)	12” (305 mm)	Up to 2,800 lbs./hr. (Up to 1270 kg./hr.)	8,000 lbs. (3629 kg)

Specifications

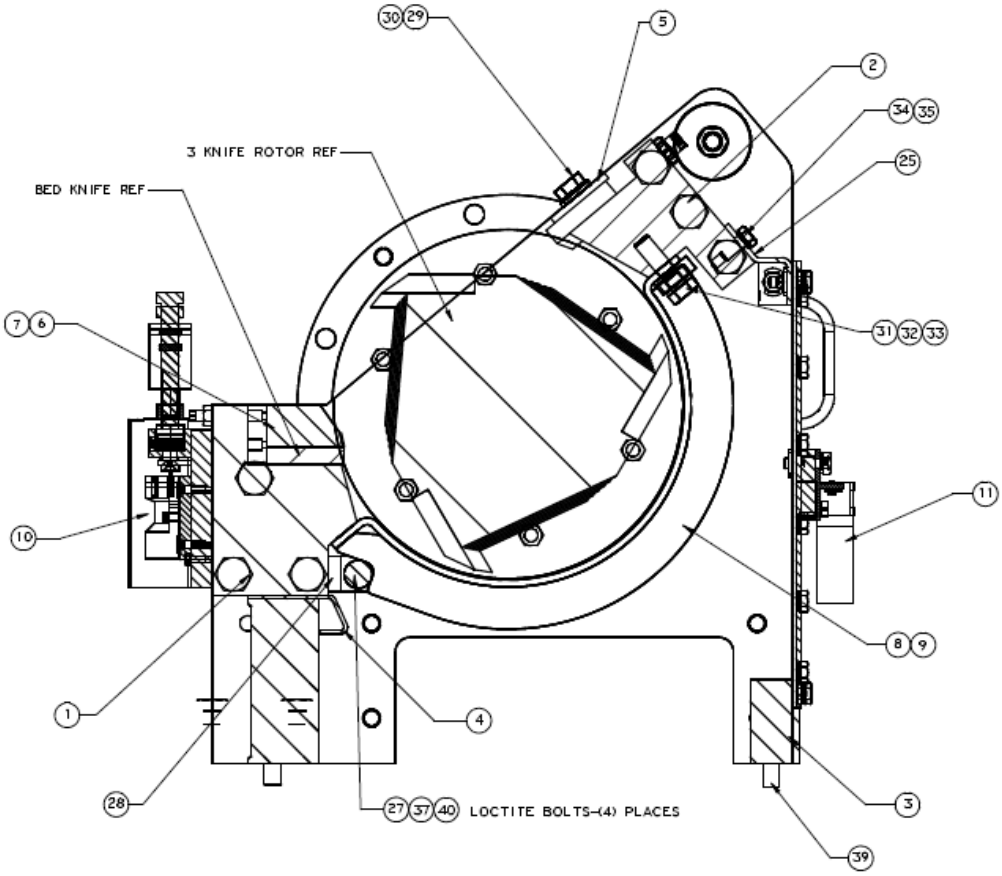
	Standard Features	Options & Accessories
In-feed	In-feed Hopper	Paddle Rolls Feed Rolls – Poly smooth
Cutting Chamber	2-Bed knives, drop down cradle	
Rotor	5-knife Twinshear	
Rotor Knives	HCHC, keen edge	
Bed Knives	HCHC, 2-edge (reversible)	
Screen	5/16”, 1-piece reversible	1/4", 3/8”, and larger
Base	Low profile caster	
Discharge	44U – 6” (152 mm) Airveyor RH	#6 Blower (5 hp / 3.7 kW), #8 Separator, #8 Stand, #8 Side Mounted Filter Head
	56U – 8” (203 mm) Airveyor RH	#8 Blower (10 hp / 7.5 kW), #10 Separator, #10 Stand, #10 Side Mounted Filter Head
	74U – 10” (254 mm) Airveyor RH	#10 Blower (15 hp / 11 kW), #12 Separator, #12 Stand, #12 Side Mounted Filter Head
Motor	44U – 20 hp (15 kW)	30 hp or 40 hp (22 kW or 30 kW)
	56U – 30 hp (22 kW)	40 hp or 50 hp (30 kW or 37 kW)
	74U – 40 hp (30 kW)	50 hp (37 kW)
Feed Roll Motor	3/4 hp, D.C.	1 hp, D.C.
Drive Parts	V-belt	
Electrical Components	NEMA 12 with safety interlocks	
Controls	230 or 460 Volt / 3 phase/ 60 Hertz, 115 Volt NEMA 12	
Labels	Safety/caution/operation (English)	French/Spanish

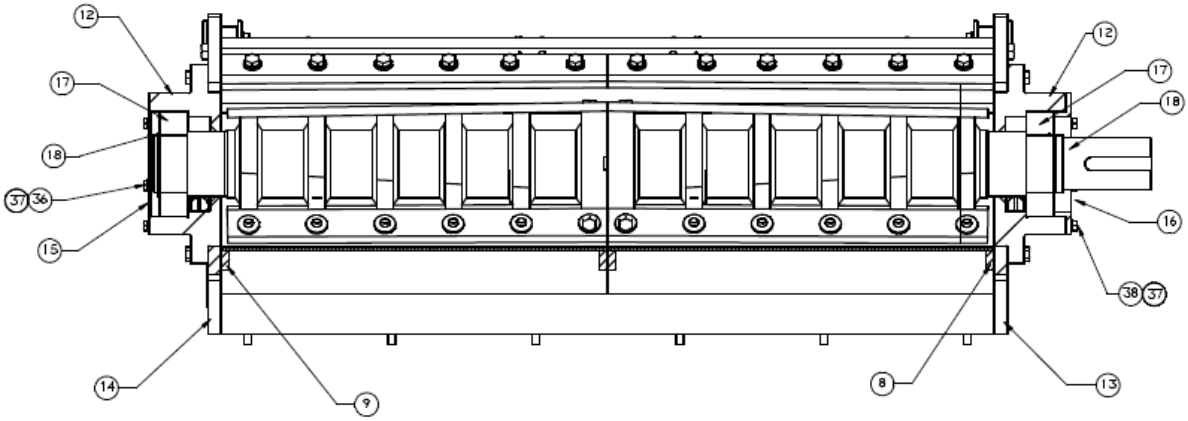
Dimensions

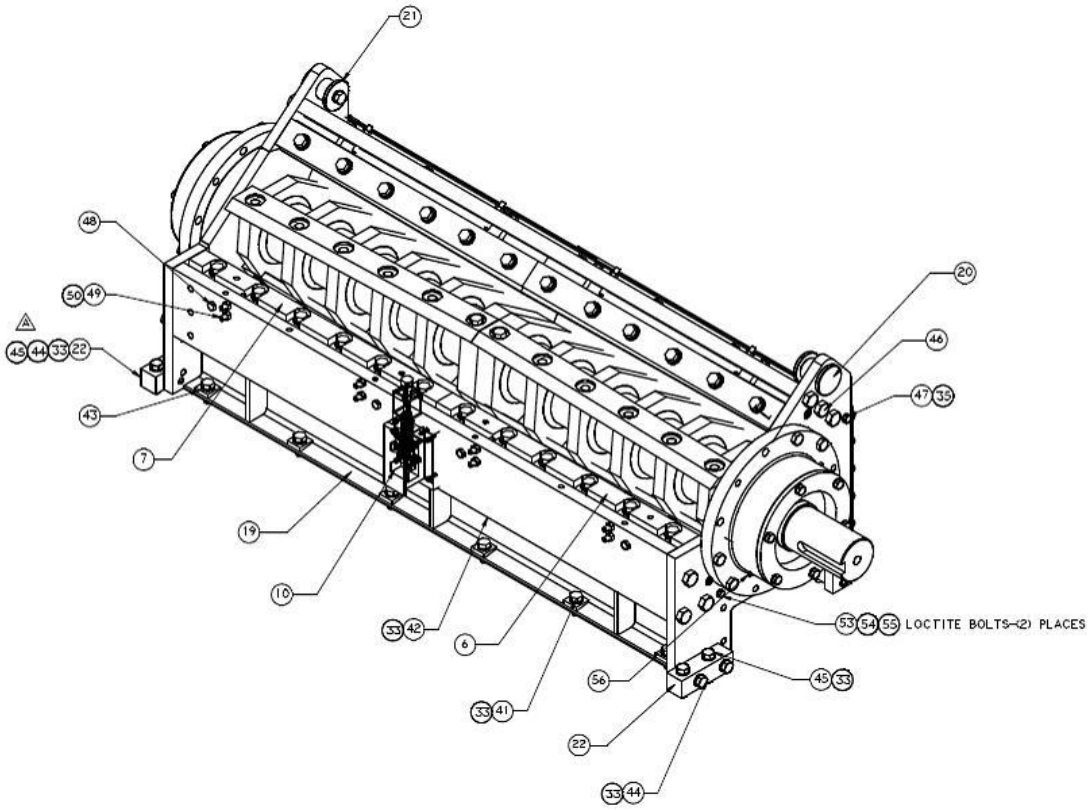


MODEL	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
44U	47"	44"	91.3"	8" DIA	5.4"
56U	59"	56"	103.3"	8" DIA	5.4"
74U	77"	74"	121.3"	10" DIA	6.4"

7-3 Illustrated Parts Breakdown



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LOCTITE BOLTS-(2) PLACES
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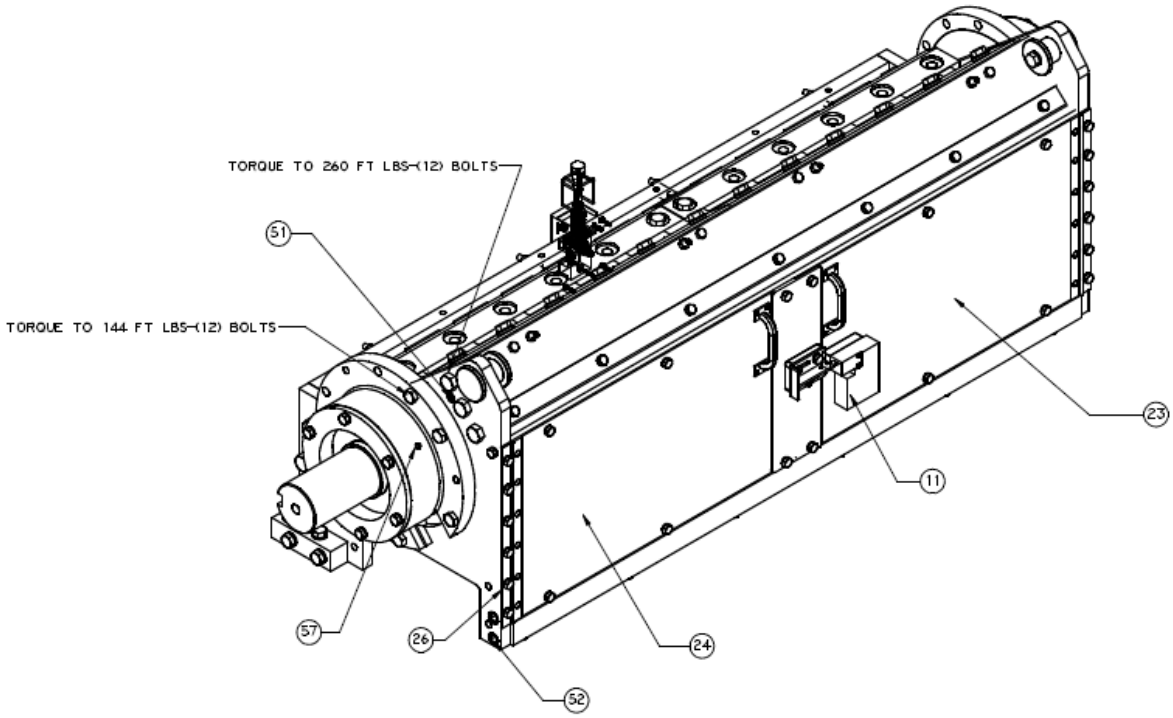
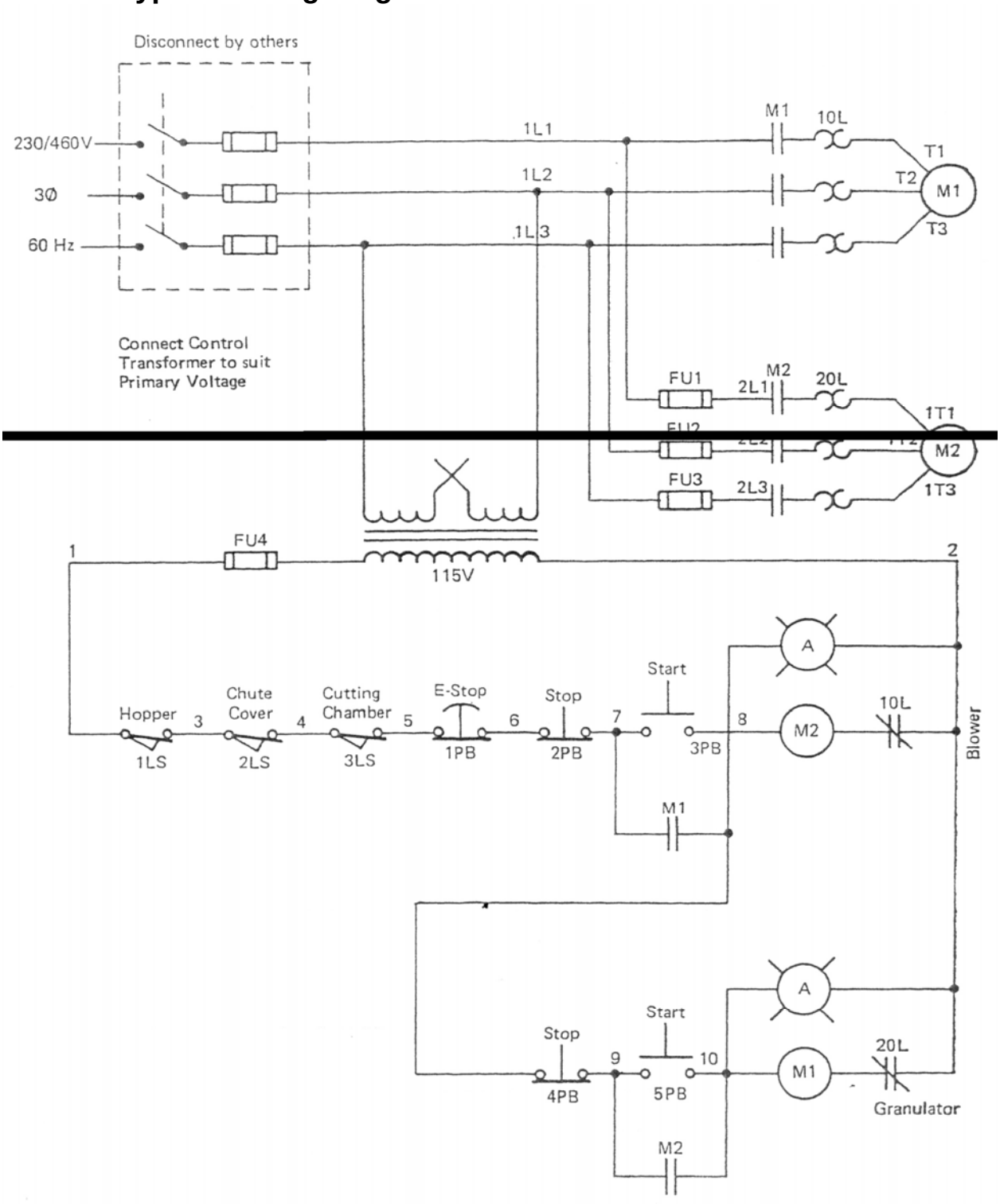

TORQUE TO 260 FT LBS-(12) BOLTS
51
TORQUE TO 144 FT LBS-(12) BOLTS
23
11
57
26
24
52

7-4 Spare Parts List

Item	Quantity		
	44U	**56U**	**74U**
Rotor Knives	3RH / 3LH	5RH / 5LH	12
Rotor Knife Bolts	30	60	48
Bed Knives	4	4	8
Bed Knife Bolts	20	24	32
Bed Knife Washers	20	24	32
Bearings	2	2	2
Bearing Housings	2	2	2
Screens	2	2	3
Screen Cradle Bolts	4/4 (8)	4/4 (8)	6/6 (12)
V-Belts	3	4	5
Casters	4	4	4

7-5 Typical Wiring Diagram



7-6 Recommended Torque for Screws

(Grade 10.9 fine thread screws in un-lubricated conditions)

Screw Size	M8	M10	M12	M14	M16	M18	M20	M24
Torque NM.	38	73	135	210	315	460	640	860
Torque Ft. Lbs.	28	54	100	155	232	340	472	810

Note: Threads must be dry. Screw threads should be wiped with an oil-dampened cloth before installation to prevent galling.

7-7 Technical Assistance

Parts Department

Call Spare Parts Express toll-free 8am-8pm EST (800) 229-2919. OEM quality replacement and spare parts ensure operation at design specifications. Please have the model and serial number of your equipment when you call. Consult the Customer Parts List included in your information packet for replacement part numbers.

Service Department

Call toll free (800) 966-8664 8am-8pm EST – Emergency service available 24 hours a day. We have a qualified service department ready to help. Service contracts are available for most of our products.

Sales Department

Call (508) 399-6400 Monday through Friday 8am-5pm EST. Our products are sold by a worldwide network of independent sales representatives. Contact our sales department for the name of the sales representative nearest you.